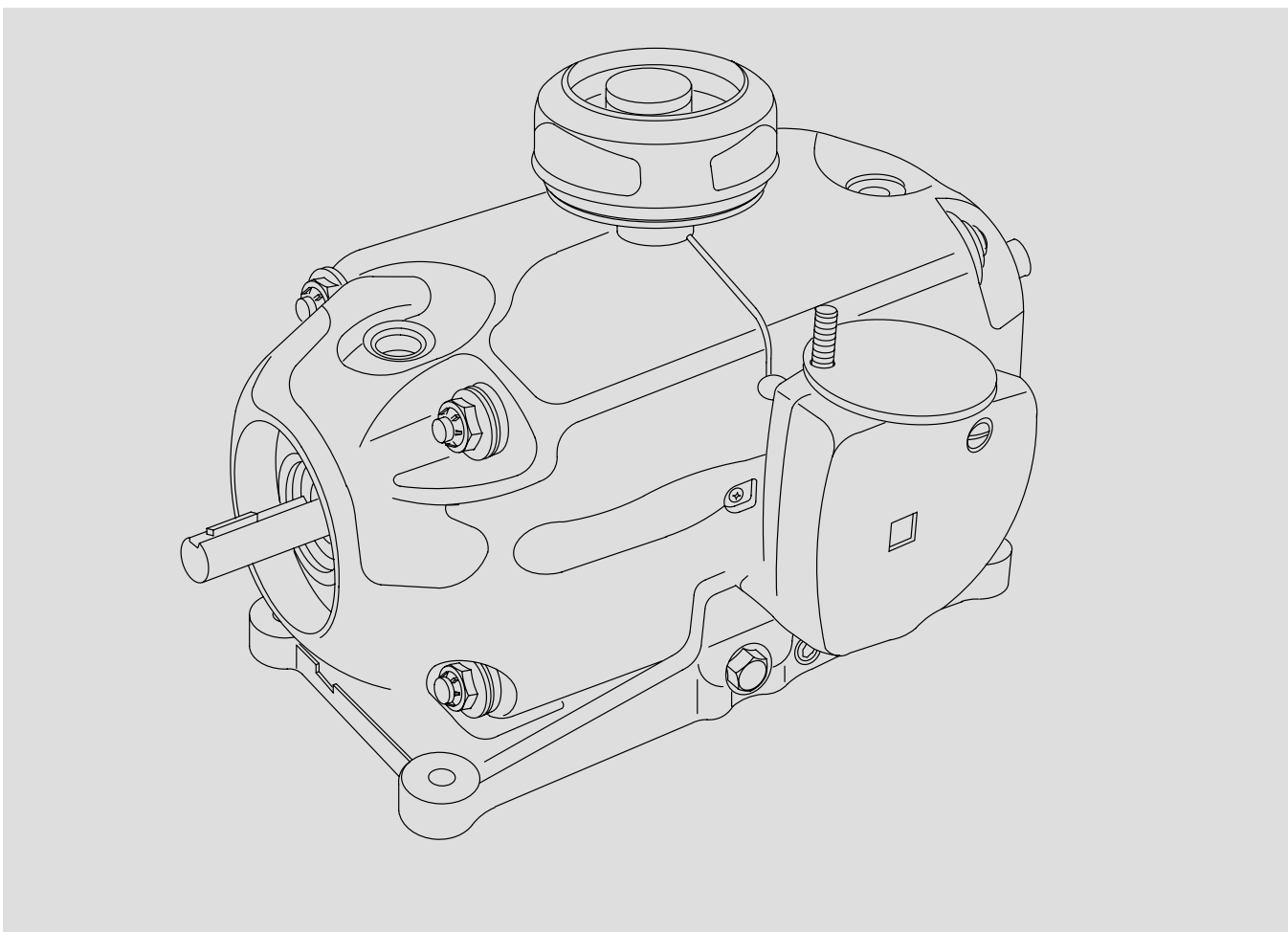




# Adjustable Speed Hydraulic Drives

TR3, PTR3 and MTR3  
Series -20 Design





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# Section I – Operating Characteristics

“A” End ..... 9-cylinder, variable delivery axial piston type pump

“B” End ..... 9-cylinder, fixed displacement axial piston type motor

Port Connections (MTR3 & PTR3) ..... AND10050-8 (3/4-16)

Operating Fluid:  
 Type ..... Use petroleum oil SAE 20-20W API, MS. Type “A” automatic transmission oil is also permissible.  
 Capacity ..... 9/10 quart

Maximum Displacement ..... 0.645 cu.in per revolution

Maximum Gauge Pressure ..... 500 psi

Input (“A” End Drive) Speed:  
 Maximum ..... 1800 rpm  
 Minimum ..... 1200 rpm

Output (“B” End Drive) Speed:  
 Maximum ..... 1800 rpm  
 Minimum ..... 100 rpm

Pump Delivery:  
 1800 rpm and 500 psi ..... 4.7 gpm  
 1200 rpm and 500 psi ..... 3.1 gpm

Horsepower Ratings:  
 Maximum input ..... 1.50 @ 1800 rpm  
 Maximum output ..... 1.12 @ 1750 rpm

Pump Yoke Control ..... Servo, Handwheel or Lever

Direction of Rotation ..... Optional

Mounting Position ..... Optional (see nameplate)

Drive Connections ..... Direct or Indirect

Shaft Diameter ..... 0.500 in.

Shaft Key ..... 1/8 in. square

# Section II – Installation

Adjustable speed hydraulic drives are precision built units and should be treated as such. Careful attention to these instructions will insure that maximum service life will be obtained. For installation dimensions, the following drawings should be referred to:

Model Number	Installation Drawing
TR3	I-259217
MTR3	I-214338
PTR3	I-214337

## A. Mounting Position

These units can be mounted in any position, provided the filler cup is above the highest level of the unit (see nameplates). Also, in the case of the motor units, the drain line must be connected to the reservoir in such a manner that the case remains full of fluid.

## B. Control Position

An optional handwheel or servo control can be mounted on either side of the variable speed drive or pump. (Model number codes for the type control and location are shown in Table 1.) The handwheel control can be moved to the opposite side of the unit if it is desired.

## C. Coupling

Conventional flexible couplings may be used, or these units may be coupled indirectly through flat or vee belts, chain drives or gears. If direct coupling is used (see Figure 1), the shafts must be aligned accurately for maximum service life. For indirect drive, the pulley, sheave, sprocket, or gear pitch diameter must be at least 2 inches.



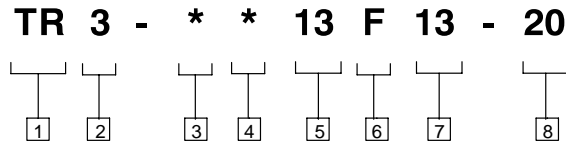
**CAUTION**

*Couplings or pulleys must be assembled to the shafts by hand. If a pulley or coupling becomes tight after operation, a wheel puller should be used to remove it. Pounding will cause damage to the shaft and bearings. Keys must not be pounded into the shaft keyways. Material can be removed by lapping to fit the keys to the shafts.*

Two keys are taped to each shaft (see Figure 2). The stepped section keys are for units replacing -13 design units, which used #4 Woodruff keys. For new installations, the square section keys should be used.

# Model Codes

## Transmission



1 Adjustable Speed Drive Units

2 Nominal – 3/4 HP (at 1200 rpm)

3 “A” End (Pump) Control  
H – Handwheel  
D – Servo  
V – None

4 “A” End Control Location (viewed from output end)  
R – Right hand  
L – Left hand

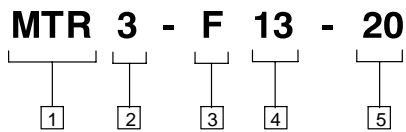
5 “A” End Size  
13 – 13/32 Cylinder Bore

6 “B” Fixed End Control  
F – Fixed

7 “B” End Control  
13 – 13/32 Cylinder Bore

8 Design

## Motor



1 Motors

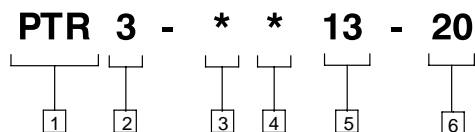
2 Series – 3/4 HP

3 Control  
F – Fixed

4 Size  
13 – 13/32 Cylinder Bore

5 Design

## Pump



1 Pumps

2 Series – 3/4 HP

3 Control  
H – Handwheel  
D – Servo  
V – None

4 Control Location (viewed from shaft end opposite shaft)  
R – Right hand  
L – Left hand

5 Size  
13 – 13/32 Cylinder Bore

6 Design

Table 1. Model Code Breakdown

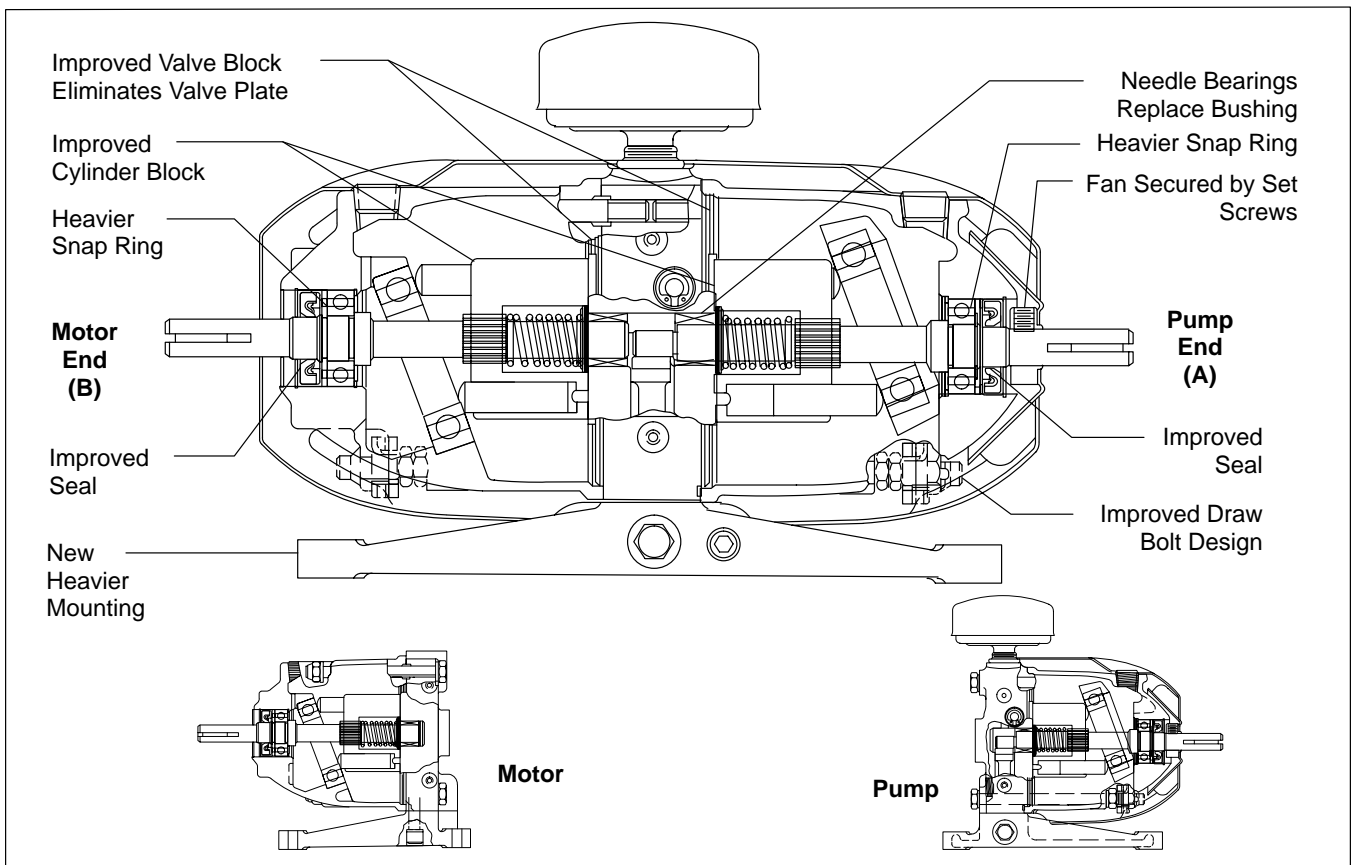


Figure 1

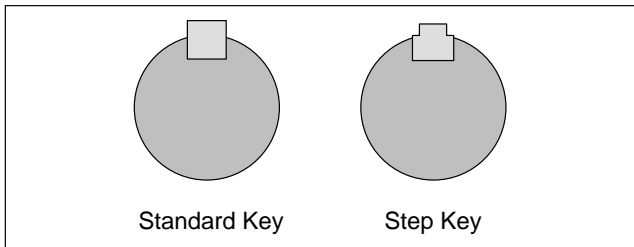


Figure 2

## D. Circuit Connection

Connections between the pump and motor of the TR3 unit are self-contained. When the PTR3 pump and MTR3 motor are connected together, they should be connected in a closed circuit. Supercharging pressure (30 psi) is provided by an integral supercharging pump in the PTR3 unit. If the PTR3 pump is used in an open circuit, the inlet must be supercharged at 30 psi. The MTR3 motors can either be used in a closed circuit supercharged at 30 psi or in an open circuit with a means of maintaining 30 psi back-pressure at the outlet.

## E. Power Source

This should be an 1150-1800 rpm electric motor or equivalent. The source must supply 1/4 horsepower more than the required output.

## F. Load

The maximum load which may be driven by these units is 3/4 horsepower. The 40 inch pounds of torque output will equal more than 3/4 horsepower at 1800 rpm, and must be considered available for starting or short intervals only.



**CAUTION**

*Stalling the output shaft for any length of time should be avoided. Pump delivery passing over the relief valve generates heat, which can cause damage to these units.*

## G. Direction of Rotation

Pump (input) shaft rotation can be clockwise or counterclockwise. The direction of motor (output shaft) rotation is changed by actuating the pump control to the other side of neutral.

# III – Operation

## A. Fluid Recommendations

Use clean petroleum oil meeting or exceeding lubricating qualities of SAE 20-20 W API service classification "MS". Type "A" automatic transmission fluid is also permissible.

Drain and refill the unit with new fluid every 1000 hours of operation or six months, whichever comes first.

## B. Start-up

The following procedure must be followed for initial start-up and each time the units are drained and refilled. (See "Fluid Recommendations")

1. Fill the TR3 or PTR3 unit to the bottom of the filler cup screen. Fill the MTR3 unit with fluid and connect the drain line to tank.
2. Couple the power source to the "A" end, but leave the "B" end uncoupled.
3. Start the power source. Allow the unit to run for about five minutes after the output shaft begins to rotate. It may tank a few minutes to eliminate the air in the system.
4. Stop the power source and couple the "B" end to the load.
5. Add fluid until the level is again at the bottom of the filler cup screen. The system can now be started under load until the fluid is next changed.

## C. Handwheel Control

The handwheel control is a manual device for varying the output shaft speed from zero to full speed in either direction.

The dial calibrations (0, 25, 50, 75 and 100) represent the output shaft speed as a percentage of the input shaft speed.

## D. Servo Control

The servo control is a mechanically operated hydraulic booster for varying the output shaft speed with minimum effort (approximately 7 ounces on the control pin).

The control arm may be rotated to any position about the control shaft. For the most satisfactory results, the control arm must be located at 90° to the direction of controlling efforts.

The control arm requires a 20° angular movement to change the output shaft speed from zero speed to full speed, or a 40° angular movement from full speed in one direction to full speed in the opposite direction.

The maximum angular movement of the control arm must not exceed 20° each side of neutral.

It is not recommended that the control arm be actuated while the drive is shut down. If, however, it is necessary to move the stroke control arm without the aid of hydraulic boost, it should be done slowly in order to avoid damage to the internal parts.

The servo control provides the most rapid means of controlling speed. With an input speed of 1750 rpm, the control may be moved from zero to full output speed in one second; at 1150 rpm input speed the time required is three seconds. Control movement in excess of that specified may cause internal damage.

# Section IV – Maintenance and Repair

The longevity of these products is dependent upon environment, duty cycle, operating parameters and system cleanliness. Since these parameters vary from application to application, the ultimate user must determine and establish the periodic maintenance required to maximize life and detect potential component failure.

The only maintenance required is to change the fluid every 1000 hours or six months, whichever occurs first, and to maintain shaft alignment.

When a unit requires repair, it is recommended that it be returned to Vickers. A stock of rebuilt exchange units is maintained at all Vickers branch warehouses. All rebuilt units carry the new unit warranty.

For customers who have the facilities to repair these precision units, the parts catalogs listed below are available from any Vickers branch or district office.

Model Number	Catalog Number
TR3	I-3815-S
MTR3	I-1839-S
PTR3	I-1840-S

## Section V – Warranty

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We warrant the articles to be free from defects in material or workmanship under recommended use and service. Our obligation under this warranty, however, is limited to repairing or replacing at our Omaha, Nebraska plant, any part, which in our judgment upon inspection, is defective as above stated, provided that notice of such defect is given to Vickers, and the article is returned to our plant, within a

period of 90 days from the date the article is placed in service or a period of 180 days from the date the article is delivered by us, whichever period first expires. Unless otherwise stated on the face of our quotation or agreed by us in writing, the foregoing sets forth our entire liability on warranties, express or otherwise. In no event will we be liable for special or consequential damages.

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### **Eaton Hydraulics**

15151 Highway 5  
Eden Prairie, MN 55344  
Telephone: 612 937-7254  
Fax: 612 937-7130  
[www.eatonhydraulics.com](http://www.eatonhydraulics.com)

46 New Lane, Havant  
Hampshire PO9 2NB  
England  
Telephone: (44) 170-548-6451  
Fax: (44) 170-548-7110

